U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
PB-277 906

A National Environmental/Energy Workforce Assessment National Abstract

National Field Research Center, Inc, Iowa City, Iowa

Prepared for

Environmental Protection Agency, Washington, D C

Dec 77

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO. PB277906
4. TITLE AND SUBTITLE A NATIONAL ENVIRONMENTAL/ENERGY WORKFORCE ASSESSMENT, National Abstract		5. REPORT DATE December 1977 - Date of Completion 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) National Field Research Center, Inc.		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS National Field Research Center, Inc. P.O. Box 287 Iowa City, Iowa 52240		10. PROGRAM ELEMENT NO. 2BC651 (36) 11. CONTRACT/GRANT NO. Grant #T900591010
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Federal Activities (A-104) 401 M Street, S.W. Washington, D.C. 20460		13. TYPE OF REPORT AND PERIOD COVERED Phase I Final Report 14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES Phase II will comprise approximately five volumes and will be available in September 1978. Phase III will be available in September 1979.

16. ABSTRACT

This study is one of 70 volumes assessing the workforce needs (manpower needs) for pollution control and abatement in the United States for the five-year period of 1976 through 1981. Seven fields for pollution control — air, noise, pesticides, potable water, radiation, solid waste, and wastewater — are analyzed, together with energy-related programs currently accentuated by the national effort to solve energy supply problems.

Designed as Phase I of a three-phase program, the complete assessment includes the following volumes: one each for the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands; one for each of the ten EPA regions; a one-volume National Abstract; a volume on National Legislation; a volume on Business and Industry; and a four-volume National Summary. The information was gathered through extensive personal interviews with responsible federal, state, and local officials in every state; with officials of representative private industrial and commercial firms; and with representatives of national industrial and trade organizations.

Phase II will develop a broad national inventory of the entire range of post-secondary and higher education training offered in the pollution control and energy areas cited above, and Phase III will offer demonstrations for curriculum changes or modifications which appear necessary to assure an adequate and properly trained national environmental/energy workforce.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Planning Regional Planning State Planning State Agencies Federal Government Planning Labor Force Manpower Forecasting	Employment Economic Surveys Energy Management Pollution Control Environmental Management Environmental Education Environmental Sciences Conservation Environment	National Environmental/Energy Workforce Assessment	

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
Release Unlimited		74
	20. SECURITY CLASS *(This page)*	22. PRICE PC A04 MF A01

EPA Form 2220-1 (9-73)

PB 277 906

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NATIONAL ABSTRACT

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REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

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NATIONAL ENVIRONMENTAL/ENERGY

WORKFORCE ASSESSMENT

NATIONAL ABSTRACT

Conducted By:

NATIONAL FIELD RESEARCH CENTER, INC.

Under Grant From

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

Grant #T900591010

1977

This document has been reviewed by the Environmental Protection Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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ACKNOWLEDGEMENT

This brief statement of recognition cannot express the value or gratitude owing to the agencies, groups or individuals who not only participated in but made Phase I of the National Environmental/Energy Workforce Assessment a reality. In particular, mention must be made of the invaluable assistance provided by the headquarters and regional staff of the U.S. Environmental Protection Agency. No less important were the effort and patience extended by state and local officials. Corporate officials from business and industry also offered significant, continuing support throughout the project, support augmented by the National Association of Manufacturers.

Persons within the Environmental Protection Agency's Office of Federal Activities worked closely with the project staff to ensure its success. Foremost are Ms. Rebecca Hanmer, Mr. J. Donald Cook, Mr. Michael Moore, and Mr. John Ropes (formerly of OFA).

Special thanks are also extended to those persons in the Federal Regional Offices of EPA who greatly assisted the project: Mr. Edgar Bernard and Ms. Elaine Pickle, Region I; Mr. Robert Knox and Ms. Louise Drake, Region II; Mr. George Dukes and Ms. Helen Nowak, Region III; Mr. Robert Roth and Mr. Larry Hyde, Region IV; Mr. Chester Shura and Mr. Joel Margolis, Region V; Ms. Patricia Allbright, Region VI; Mr. John Coakley and Mr. Steve Fishman, Region VII; Mr. Elmer Chenault, Region VIII; Mr. Robert Mullinaux, Region IX; and Ms. Helen Weitz, Region X.

PREFACE

Before reading the text of this abstract of the National Environmental/Energy Workforce Assessment, it should be understood that the commentary and recommendations herein represent the viewpoints of professionals working in the disciplines encompassed by this study. Further, this information was compiled largely from personal interviews by research staff working in each of the 50 states, the District of Columbia, Puerto Rico and the Virgin Islands and enriched by extensive mailings and telephone conversations. The value of the interview process cannot be underestimated, because it allowed state agency staffs to become more familiar with the project and to provide greater amounts of meaningful information.

The following data should reflect a high degree of reliability because of the generous involvement of state and local officials. And, in the realm of workforce projections, the "best professional judgment" of practitioners from a national universe probably represents a reasonable picture of the situation. This is not to say that this study eclipses all other similar foregoing, ongoing or anticipated efforts, but rather that thousands of hours of interviews compiled into state and regional reports certainly will provide both a quantitive and a unique, qualitative perspective to the reader. Its ultimate value will be as a contribution to the information and knowledge necessary to protecting and enhancing the quality of our environment.

FOREWORD

In May of 1976, work was begun on this National Environmental/Energy Workforce Assessment (NE/EWA). The study was carried out for the Office of Federal Activities of the United States Environmental Protection Agency by National Field Research Center, Inc. of Iowa City, Iowa. Information was compiled through National Field Research Center's main office in Iowa City and regional offices in Atlanta, Georgia; Denver, Colorado; Seattle, Washington; and Washington, D.C.

Designed as Phase I of a three-phase program, NE/EWA was carried out by utilizing extensive on-site interviews in each of the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. Considerable information was also obtained from EPA federal personnel in each of the ten regional offices and from EPA headquarters in Washington, D.C. Telephone interviews and mail surveys complemented on-site research.

As noted in the original NE/EWA proposal, proper study and coordination can tie together solutions to three seemingly unrelated problems: high rates of unemployment; disparity between formal education and practical work needs; and continued destruction and pollution of the environment. This study was undertaken to assess workforce needs in protecting the environment and to sample educational offerings available to fill these needs. Workforce levels and workforce projections to 1982 were conducted for the following pollution control and abatement areas: air, noise, pesticides, potable water, radiation, solid waste, wastewater, and energy.

The primary objective of the project was "to provide the United States Environmental Protection Agency with the information necessary to formulation of a rationale for initiating and supporting national education and training programs in environmental/energy fields." Information on pollution control and abatement programs, current workforce profiles, and projected workforce needs is developed in individual state and regional reports. This National Abstract brings together much of the pertinent data contained in those individual reports, but it cannot take the place of the analysis and insights provided in the other volumes.

NATIONAL ENVIRONMENTAL ENERGY WORKFORCE ASSESSMENT

INTRO-DUCTION

This study is an assessment of the workforce needs for pollution control and abatement in the United States for the five year period of 1976 through 1981. The seven fields for pollution control and abatement established under the Environmental Protection Act (air, noise, pesticides, potable water, radiation, solid waste, wastewater) were analyzed, together with energy-related programs currently accentuated by the national effort to solve energy supply problems.

The information presented here was gathered and compiled through personal interviews with responsible federal, state and local officials working in the environmental field in every state. In addition, there were personal interviews with officials of representative private industrial and commercial firms, as well as national industrial and trade organizations. The interviews were followed up with telephone calls and personal letters to supplement or clarify the first information which was collected.

Any system of projecting workforce requirements is obviously subject to a wide margin of error, but we believe that the system used here offers the best possible summation of employment requirements in the field and will be useful in meeting urgent national goals and responsibilities in the environmental/energy sector. Phase II of this study will develop a broad national inventory of the entire range of post-secondary and higher education training offered in these fields, and Phase III will offer demonstrations for curriculum changes or modifications which appear necessary to assure an adequate and properly trained national environmental/energy workforce.

A summary of workforce projections of this study indicates no major new problems in workforce requirements, but primarily an accentuation of existing problems in some fields and lessening of demands in others. This information should be helpful in focusing attention on continuing shortages of properly trained personnel in some fields which have not as yet received national attention. It will be helpful to college educational administrators in forecasting employment demands for graduates---as an initial introduction to more specific information about career training which will be enlarged upon in findings of Phases II and III.

While few new or unique career fields are likely to emerge during the period of our projection, there are certain to be new combinations and realignments of the use of existing skills. In light of the continuing budget limitations and restraints at all levels of government, it is likely that there will be stronger emphasis upon utilizing greater combinations of skills and on improving the quality of available training.

Engineers with special expertise in the environment and the relationship of environmental standards to industrial production and general public policy will continue to be the most sought-after employees in the field. Engineers with specialized environmental skills are often in a position to pick and choose job opportunities from a wide variety of openings. These openings should expand by about 10 to 15 percent per year through 1982, although the greatest growth will probably come in 1978 to 1979.

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Major expansion of career opportunities will come in the following disciplines (in likely order of demand): chemical, environmental systems, sanitary/civil, environmental, mechanical, electrical, general, and nuclear. Physical and natural scientists will be next in demand, as follows: chemists, physicists, micro/macro biologists, aquatic biologists, toxicologists, agronomists, plant pathologists, botanists, and agricultural engineers.

This summary of the most sought-after career specialists does not include a few of the more specialized openings for which only a handful are currently being trained throughout the country. There will be an increasing demand for health physicists, including nuclear engineers and pathologists with medical or veterinary degrees. Persons with this training already appear to be unavailable for most federal and state environmental agencies because of active demand from private employers and research programs.

Regional differences in employment projections reflect geographic conditions, types of industrial development and, to some extent, the comparative effort to enforce all types of environmental standards by state and local agencies. The regional reports provided as part of this overall study deal primarily with staffing projections for the ten regional offices of the Environmental Protection Agency, but they provide a good interpretation of the working relationship of each of the regions with the various states over which the regional office has jurisdiction.

POLLUTION CONTROL

and

ABATEMENT PROGRAMS

AIR

State and federal regional staffs can expect a growth rate of approximately five percent per annum for professionals and technicians during the next five years. Turnover has been high in the past, but changing economic conditions and a surplus of graduates (except for engineers)is reducing change. Recent increases in state salary levels have also contributed to a leveling off of turnover to approximately five to ten percent per year. Even more stringent limitations on federal training assistance in the university system and the tuition program for special training courses are likely to further limit the availability of fully prepared air pollution scientists.

Most state programs meet minimum standards. Indications that amendments to the Clean Air Act will not require major changes in compliance schedule requirements further indicate no special additions to workforce requirements.

This EPA program generally involves the least activity throughout the country. Workforce growth will probably be limited to two to four percent, and those added will probably be engineers or highly trained technicians. There are some reports of proposed new legislation, both state and federal, in 1978, which might change the projection.

Most current noise abatement programs have local origin or emphasis. Both the Quiet Communities and Each City Helps the Other (ECHO) offer the possibility of workforce requirements not projected here.

NOISE

PESTICIDES

The pesticide workforce problem is primarily current to 1977, tied to the requirement of certification of operators by October, 1977. Estimates current at the writing of this report indicate that approximately seventy-five percent of the operators in the field will be certified by that date.

Commercial applicators of pesticides will probably increase by an average of five percent annually, and private applicators will decrease, as the more skilled application proves the most economical. Integrated pesticide management is still a very limited field for professionals, although the outlook should improve as skilled management demonstrates efficiency and economy. Job opportunities will continue to be available in the applicator field because of high turnover. This turnover will continue to result from the low pay, danger, and seasonal nature of the work.

The operator workforce will increase from ten to twelve percent per annum, with a possibility of higher rates in a few states where certification of operators will become mandatory. Some states appear likely never to establish mandatory certification, and turnover will continue high because of relatively low pay and lack of professional status for the operator.

Other than operators, engineers will be chief among professionals hired, with a limited number of geologists and hydrologists.

The Safe Drinking Water Act of 1974 is also likely to have a profound impact on the potable water workforce. As states assume primacy, the workforce in some states may increase by over fifty percent during the next five years.

POTABLE WATER

RADIATION

During the five year projection period, anticipated growth in this field will be limited to two or three percent. This outlook will sharply change in the later 1980s, however, as a new crop of nuclear power installations are brought on-line. As mentioned in the introduction, there is a shortage of highly qualified specialists for whom most federal and state agencies are precluded from bidding because of pay scales. New plants and more rigid standards could change the workforce picture, but the outlook for the five years covered here involves relatively minor change.

SOLID WASTE

The Resource Conservation and Recovery Act of 1976 (RCRA) will have a significant effect on workforce levels in this field, especially for engineers, geologists, and systems management experts. Workforce totals will probably increase by ten percent per year through 1979, and then the rate will gradually decline. No projections have been made here for major energy conversion activity, but discussions in the late stages of this report indicate the probability of unprojected requirements.

Solid waste collection activities will turn more and more to the transfer station concept, and the number of landfill operators will decline as the number of landfills decrease as a result of the RCRA requirements.

The states expect massive federal assistance in making these changes, including technical assistance in developing solid waste management plans.

WASTEWATER

Most of the projections for potable water apply also to wastewater treatment. As professional requirements are increased, professional plant operators will be added at a rate of ten percent per year, but turnover will continue high in the overall field.

Continued upgrading of wastewater treatment requirements will result in continuing requirements of more professional personnel and more upgrade and in-house training. Added requirements for more intensive treatment are not as likely in the future, as more local resistance develops to changes which are believed to have questionable value to the overall water quality picture, especially when they add materially to local costs.

ENERGY

Program activity in the monitoring of environmentally related aspects of energy programs is currently relatively stable and is not expected to expand greatly during the five year projection period.

No detailed assessment could be made of the effect of new energy programs currently being considered or put into effect, but it is obvious that there will be sharp increases necessary in professional monitoring personnel as conversion to coal moves toward proposed goals and many more nuclear plants are brought into operation.

Most states now have energy agencies established first for fuel allocation. Staff personnel were not originally recruited as professionals competent to do environmental monitoring or develop state energy plans. Considerable changes may be in the making, as each state competes for adequate energy sources for current and projected needs.

STATE NEEDS

During the course of this study, it was noted on several occasions that there is a need for the federal government, through the EPA regional offices, to provide assistance to the states based on their respective needs. Foremost among these needs is more frequent and more specific job training conducted in the states.

The states are also in need of more federal support in terms of financial resources and personnel. Not all states are able to assume the complete financial obligation of operating programs following the initial federal support. In addition, the hiring of personnel for short-term or highly technical positions is often prohibitive.

Air protection programs represent one of the earliest and best-supported state environmental efforts. California was an early leader in controlling motor vehicle emissions; many northeastern industrial states have made significant progress in reducing stationary source emissions over the past ten years. A matter certain to attract considerable attention over the next five years is anti-degradation air quality regulations; many less-industrialized and western states are resisting these regulations as they will limit development.

Most states have not made noise control a major priority because of limited resources. Illinois, California, and Delaware have comprehensive noise programs and are among only a handful of states with state-wide noise legislation. Other heavily-populated states are likely to emphasize noise programs to a greater extent in the future, particularly if federal support is available.

The new pesticide legislation regarding applicator certification has affected nearly all states in the same manner. Development of training and certification plans has consumed a great deal of time recently as the October, 1977 deadline nears. Many state officials expressed concern that the same workforce which has been straining to meet pesticides requirements will also be responsible for portions of the new Toxic Substances Control Act. Clearly there will need to be a great deal of federal guidance in this regard.

The Safe Drinking Water Act of 1974 is the most comprehensive indication of state needs in the potable water area. Most states are expanding their workforces to attain primacy under the Act. However, other states, such as Oregon, have felt the budgetary pressures of other environmental programs and are limiting their involvement in the drinking water field.

Radiation has been under the control of a health department in most states, but it is an area gaining recognition as an environmental field. Illinois and Pennsylvania are two of the first states with comprehensive radiation legislation, but other states can be expected to follow their lead as radioactive material use, transportation and disposal become more common. Currently 25 states have reached "agreement state" status with the Nuclear Regulatory Commission; the fact that more states are expected to attain this status is a reflection of state interest in the radiation field.

With passage of the Resource Conservation and Recovery Act of 1976, the federal government signaled

the shift in solid waste management from disposal to recycling. Most states are still attempting to deal with solid waste disposal and feel that resource recovery will be prohibitively expensive or impractical because of sparse populations. Other attempts at solid waste control include beverage container deposit laws in Oregon and Vermont, and a unique litter control law in Washington.

Wastewater and water pollution control have received a great deal of financial and workforce support in most states in the past. As a result, water quality in many rivers and lakes has improved dramatically in recent years. However, most state officials feel that there is a need for an even greater commitment in the area as non-point sources of pollution are brought under control and operator certification is made mandatory. Regional and interstate cooperation may lead to greater efficiency in handling specific water pollution problems.

The energy activity in most states originated with fuel allocation in 1974. Except for energy-producing activity, most state programs are rather minimal and there is an indication that states are awaiting energy developments at the federal level before expanding their efforts. Coordination of energy needs and conservation are two areas in which most states will be involved.

BUSINESS
and
INDUSTRY

Employment of personnel for environmental work can be expected to increase sharply during the next five years, but it is impossible to quantify forecasts because of the limited scope of direct interviews, either on-site or by telephone. Problems relating to the industrial workforce are detailed in the Business and Industry Report of this study.

The completed surveys were numerous enough for the electric utility and chemical industry to warrant acceptance as a significant sampling of environmental employment plans in the industry, although the sampling is too limited for definitive projections.

Of the electric utilities interviewed, 58 percent predicted an increase in employment ranging from 5 to 15 percent, while 42 percent predicted a growth of at least 50 percent. Making full allowances for sampling error, it is safe to predict major increases in environmental personnel in these two industries.

Environmental personnel have yet to be categorized or classified by any standardized procedure. More accepted classifications can be expected as employment in the field grows and as career training in institutions of higher education is adapted to fit industry needs more closely.

A major industrial practice at present is to shift personnel from other divisions into environmental work. Another is to use outside consulting firms (most often consulting engineers) to adapt production to environmental standards. Both of these practices make for difficulties in employment projections.

CONCLUSION

Most of the states and the EPA Regional Offices have sufficient personnel to carry forward the EPA pollution control and abatement programs with reasonable competence and speed. The urgency with which this task is carried forward varies among programs and among states, and this study was not mandated to measure the quality of performance.

An analysis of the projected workforce requirements, however, yields several indications that no major effort for maximum enforcement can be expected to be made. Other projections indicate that some programs given special assistance or emphasis in the past have not been pared as much as might be possible under changing conditions. If over-generous staffing by states continues in some areas after withdrawal of federal support, it may be at the expense of other highly essential programs.

No attempt has been made in this assessment to measure the efficiency of organization to deal with environmental programs of the various state structures. A review of the various state reports should offer some suggestions for consideration by state officials concerned in this area.

Although most states have indicated realization of the value of workforce assessments and an evaluation of post-secondary and higher education programs to meet these needs, only Illinois has carried out such a study. EPA could well encourage similar state efforts related to all three phases of this project.

A universal complaint from state agency officials concerned with hiring entry-level personnel or upgrading existing staff is the lack of "real world" practicality in some of the training materials and training directives which comes to them through EPA.

Some of these complaints are obviously the inevitable result of a local official being told, even by implication, that he/she is not meeting a high enough standard, but others have real merit. When improved standards are expected to be achieved by upgrading requirements for certification, for instance, detailed explanations need to be made, sometimes in person.

EPA has no well-developed national training strategies, except in a most indirect fashion which seems to indicate that the marketplace (e.g., availability of jobs) will generate training by state and private educational systems. This study, however, is a supplement to that concept, in that it points out to potential institutional users the projected workforce demand. Later phases will enable a more indirect comparison of available facilities to meet training requirements.

EPA regional manpower officials could have a much stronger impact in improving the efficiency of state agency personnel if each region could be funded for a limited number of seminars and workshops to which state workers could be invited without constraints of state cost-sharing or other decisions about personnel attending which might eliminate those with the greatest "need to know". Some of these training sessions could be better handled by the states themselves with direct federal subsidy through the region.

One of the all too evident findings of this study, although not directly part of the workforce assessment, is the fact that too many state agencies do not have the most useful working relationship with the EPA regional office. This is partly an inevitable

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result of any situation where the federal agency is of necessity the final arbiter of enforcement. It is possible, however, to offset some of this conflict through the use of the important advantages the regional office holds as the source of money and essential technical assistance. The regional offices can best use these considerable advantages of having personnel to put in the field to work with state agencies, to fully understand the state's problems and viewpoints, and to try to make sure that the programs which are funded will make for the most efficient utilization of a state workforce, as well as meeting an essential problem.

These general conclusions, all related to workforce needs and workforce training programs, indicate a number of shortcomings. The summary of defects, however, should not obscure the fact that EPA has provided the leadership in mounting a massive overall program to protect and improve the quality of the environment, and that state and local government, together with the entire private sector of the economy, have put into effect most of the needed changes. Both the carrot and the stick have had to be used upon occasion in securing this assistance and will have to be used again, but voluntary compliance has been the cornerstone of the system.

A properly trained professional and technical workforce is an essential part of the national environmental effort. This workforce assessment indicates that essential needs can be met without emergency measures, but the realization of these needs cannot be overlooked.

NATIONAL ENVIRONMENTAL ENERGY WORKFORCE PROJECTIONS 1976-1982

WORKFORCE PROJECTIONS BY STATE

WORKFORCE PROJECTIONS BY STATE

Introduction

The diversity that is an essential component in the greatness of our country is not limited to geography and climate. Diversity is well evidenced among the state governments. Agencies' responsibilities vary from state to state; within similar agencies, divisional organization is often quite dissimilar. Differences are compounded by priorities and resultant program emphasis unique to each state, and furthered due to the individual state's fiscal situation.

These differences affect the availability and nature of data concerning the national environmental/energy workforce. The significance of the effects were realized early in the national assessment. Researchers in the field made extensive attempts to obtain data which were comparable from state to state. This was not always possible.

Variances in availability and form of data are detectable in the following tables. In any set of composite tables, consistency and comparability are of utmost importance. In order to achieve these criteria, only the government component (state, county and local) of the public sector is represented in the composite national tables. Notable exceptions are the tables for potable water and wastewater certified treatment plant operators. Data of sufficient comparability were available for these two areas of the private sector.

Every state report contains significant information which could not be adapted to the composite table format. The reader who desires more complete detailed information (including data regarding the private sector) is encouraged to refer to the appropriate state report.

TABLE INFORMATION AND INTERPRETATION

The following comments will prove useful for accurate interpretation of the data depicted in the tables.

Use of Asterisk (*):

- The asterisk (*) is used for instances in which data consistent with the data base for the table is not available.
- This assumption of "no change" allows for consistency throughout the projections; however, it should be noted that the resulting totals necessarily represent a very conservative growth, both in rate and actual increases over the five-year period.

Rates of Increases:

- Several states show substantial increases in one or more pollution control and abatement areas. Most frequently such increases are predicated upon the assumption of primary responsibilities for major federal legislation.
- Many states which are depicted as in a no-growth or small growth situation could witness dramatic growth if primacy is assumed.
- Several sources indicated that the data they provided were conservative and subject to considerable change. The most frequent explanation for the inability to be more specific and accurate was the uncertaincy at the state level as to potential new federal legislation and interpretation and enforcement posture regarding extant legislation.

Certified Operators:

- Not all operators are certified. The proportion of certified operators in state operator workforces varies considerably.
- Many states have only voluntary certification requirements. This does not necessarily mean that their operator workforce is not well qualified; however, it often means a smaller proportion of the total are certified.
- Several state with voluntary certification anticipate instituting mandatory certification requirements in the next two or three years. Thus, the number of certified operators could increase more rapidly and to a greater total than indicated in the tables.

Total Public Sector Workforce Projections by State:

- This table does not include the state workforce in energy-related areas because data for the energy field do not meet comparability and consistency requirements. This is due to the degree in which organization of the energy workforce varies from that of the pollution control and abatement areas.

AIR - Workforce Projections by State 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	88	94	102	110	115	120
ALASKA	15	16	18	19	20	20
ARIZONA	67	75	77	79	81	84
ARKANSAS [1]	26	26	26	30	31	31
CALIFORNIA [2]	1,346	1,440	1,492	1,538	1,585	1,633
COLORADO [1]	62	63	69	75	80	84
CONNECTICUT	116	116	116	116	116	116
DELAWARE [1]	24	25	28	29	32	33
FLORIDA	177	194	223	244	267	290
GEORGIA	86	82	85	86	87	87
HAWAII [1]	12	12	12	12	12	12
IDAHO [1]	18	25	28	30	32	33
ILLINOIS [1]	130	132	136	139	142	144
INDIANA	140	181	181	183	189	191
IOWA [1]	36	36	36	38	38	40
KANSAS	34	34	32	33	35	38
KENTUCKY	165	169	184	199	205	207
LOUISIANA [1]	27	27	27	27	27	27
MAINE [1]	19	19	19	19	19	19
MARYLAND	185	185	185	185	185	185
MASSACHUSETTS [1]	100	100	100	100	100	112
MICHIGAN	131	131	131	131	131	136
MINNESOTA	50	52	54	56	58	60
MISSISSIPPI [1]	54	56	57	63	64	65
MISSOURI	80	83	83	83	83	83
MONTANA	39	39	40	41	43	44
NEBRASKA	26	26	26	26	26	26
NEVADA	21	23	25	27	29	29
NEW HAMPSHIRE [1]	21	21	21	21	21	21
NEW JERSEY [1]	175	183	192	201	211	221
NEW MEXICO	50	51	52	53	54	55
NEW YORK [1]	211	276	290	305	320	333
NORTH CAROLINA	141	141	142	144	145	146
NORTH DAKOTA	30	30	30	32	33	33
OHIO	332	340	373	378	388	397
OKLAHOMA	60	61	62	63	64	65
OREGON	90	95	96	97	97	97

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA[1]	224	232	259	276	306	325
RHODE ISLAND[1]	15	22	24	27	29	30
SOUTH CAROLINA[1]	65	65	69	69	73	73
SOUTH DAKOTA[1]	8	6	6	6	6	6
TENNESSEE	150	150	150	150	150	150
TEXAS	525	533	541	549	558	567
UTAH	28	29	32	34	36	37
VERMONT[1]	16	16	16	16	16	16
VIRGINIA[1]	117	122	127	131	136	140
WASHINGTON	93	96	96	96	96	96
WEST VIRGINIA[1]	59	66	75	82	91	100
WISCONSIN	76	82	82	82	82	82
WYOMING[1]	14	14	14	14	14	14
D.C.	19	19	19	19	19	19
PUERTO RICO	28	36	38	40	42	44
VIRGIN ISLANDS	10	10	10	10	10	10
TOTAL	5,831	6,157	6,408	6,613	6,829	7,026

(For more information, refer to individual state report.)

AIR - GENERAL STATEMENT

The entries in this table include data regarding state and local (county and/or municipal) programs, unless otherwise indicated.

FOOTNOTES

[1]Entries include workforce projections at the state level only. Data regarding local programs were not available.
[2]California has an extensive local program effort which is reflected in the table.

NOISE - Workforce Projections by State 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	1	1	1	1	1	1
ALASKA	1	1	3	3	3	3
ARIZONA	2	2	2	2	2	2
ARKANSAS	0	0	0	0	0	0
CALIFORNIA[1]	5	5	6	7	8	10
COLORADO	3	3	3	3	3	3
CONNECTICUT	2	2	2	2	2	2
DELAWARE	6	7	9	9	10	10
FLORIDA[2]	2	2	4	6	8	11
GEORGIA	4	4	4	4	4	15
HAWAII	10	10	10	10	10	10
IDAHO	0	0	0	0	0	0
ILLINOIS	18	18	18	18	18	18
INDIANA	1	2	2	2	2	2
IOWA	4	4	4	4	4	4
KANSAS	6	6	8	8	8	8
KENTUCKY	2	2	8	8	8	8
LOUISIANA	0	0	0	0	0	0
MAINE	2	2	2	2	2	2
MARYLAND	1	1	1	1	1	1
MASSACHUSETTS	7	7	7	7	7	7
MICHIGAN	6	6	6	6	6	6
MINNESOTA	2	2	6	6	6	6
MISSISSIPPI	0	0	0	0	0	0
MISSOURI	2	2	2	2	2	2
MONTANA	2	2	2	2	2	2
NEBRASKA	0	0	0	0	0	0
NEVADA[3]	4	4	4	4	4	4
NEW HAMPSHIRE	2	2	2	2	2	2
NEW JERSEY	5	5	12	16	19	23
NEW MEXICO	1	1	1	1	1	1
NEW YORK	6	3	7	8	9	9
NORTH CAROLINA	1	0	0	0	0	0
NORTH DAKOTA	2	2*	2*	2*	2*	2*
OHIO[4]	0	0	0	0	0	0
OKLAHOMA	1	1	1	2	2	2
OREGON[5]	4	4	5	6	7	8

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	1	1	6	9	12	12
RHODE ISLAND	2	2	2	2	2	2
SOUTH CAROLINA	1	1	1	1*	1*	1*
SOUTH DAKOTA	0	0	0	0	0	0
TENNESSEE	0	0*	0*	0*	0*	0*
TEXAS	5	5	5	5	5	5
UTAH	4	4	5	6	6	6
VERMONT	1	1	1	1	1	1
VIRGINIA	1	1	1	3	3	4
WASHINGTON	1	1	1	1	1	1
WEST VIRGINIA	0	0	0	0	0	0
WISCONSIN[6]	0	0	0	0	0	0
WYOMING	0	0	0	0	0	0
D.C.	4	3	12	12	12	12
PUERTO RICO	3	4	4	6	6	6
VIRGIN ISLANDS	1	1	1	1	1	1
TOTAL	139	142	183	201	213	235

(For more information, refer to individual state reports.)

NOISE - GENERAL STATEMENT

Many states have no noise-related legislation. Others have legislation or regulations relating to vehicles only. Noise control activities in these states are minimal and often conducted in response to complaints and/or in conjunction with federal legislation (OSHA). These functions are often dealt with by persons whose noise-related responsibilities comprise a very small proportion of their time.

The entries in this table include state employees only. State Department of Transportation employees and law enforcement officers are excluded.

FOOTNOTES

[1]The entries represent only the staffing level of the California Office of Noise Control. They do not include persons involved in the extensive local program efforts, nor do they include California State Highway Patrol personnel.

[2]The entries do not include local program employees or university personnel under contractual agreements.

[3]Nine Safety and Health Officers whose duties include minimal noise-related activities are excluded.

[4]Some 30 to 40 employees of the Ohio Department of Transportation and the Ohio Department of Public Health have minor time commitments to noise control. They are not included here because the limited extent of their activities in this regard.

[5]Data include Oregon Department of Environmental Quality employees only. Not included are a limited number of Department of Transportation personnel engaged in some noise control activities of a minimal extent.

[6]Employees of the Wisconsin Department of Transportation and the Department of Health and Social Services have minimal noise-related responsibilities, and are accordingly excluded.

PESTICIDES - Workforce Projections by State 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	35	35	47	47	47	49
ALASKA	2	2	2	2	2	2
ARIZONA[1]	65	66	67	68	69	71
ARKANSAS[2]	64	64*	64*	64*	64*	64*
CALIFORNIA[3]	96	104	112	120	128	139
COLORADO	10	10	12	14	14	14
CONNECTICUT	4	4	4	4	4	5
DELAWARE	2	5	5	5	5	5
FLORIDA	129	131	137	137	137	137
GEORGIA[4]	70	70	70	70	70	70
HAWAII	20	20	20	20	20	22
IDAHO	8	9	10	11	12	13
ILLINOIS[5]	51	51	51	51	51	51
INDIANA	21	21*	21*	21*	21*	21*
IOWA	20	20*	20*	20*	20*	20*
KANSAS	36	36*	36*	36*	36*	36*
KENTUCKY	33	33*	33*	33*	33*	33*
LOUISIANA	33	38	40	41	41	41
MAINE	8	8	8	8	8	8
MARYLAND	32	33	34	35	36	36
MASSACHUSETTS	14	14	14	14	14	14
MICHIGAN[6]	115	115*	115*	115*	115*	115*
MINNESOTA[7]	23	23	23	23	23	23
MISSISSIPPI	58	58*	58*	58*	58*	71*
MISSOURI	66	66*	66*	66*	66*	72
MONTANA	12	11	11	11	11	11
NEBRASKA	8	9	10	10	10	10
NEVADA	17	17	17	17	17	17
NEW HAMPSHIRE	4	4	4	4	4	9
NEW JERSEY	10	15	16	17	18	19
NEW MEXICO	11	11	11	11	11	11
NEW YORK	47	47	54	54	54	54
NORTH CAROLINA[8]	70	70	70	70	70	72
NORTH DAKOTA	5	11	11	11	11	11
OHIO	11	14	14	14	17	17
OKLAHOMA	27	27	29	30	31	31
OREGON[9]	61	64	65	71	75	80

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	13	13	27	27	30	30
RHODE ISLAND	9	9*	9*	9*	9*	11
SOUTH CAROLINA	41	42	43	44	45	47
SOUTH DAKOTA	9	9	9	9	9	9
TENNESSEE	34	36	38	40	41	42
TEXAS[10]	90	104	127	135	142	147
UTAH	26	26	26	26	26	26
VERMONT	9	9	9	9	9	9
VIRGINIA	7	8	9	10	11	11
WASHINGTON	11	11	11	11	11	11
WEST VIRGINIA	3	3	5	6	6	6
WISCONSIN	34	36	36	36	36	36
WYOMING	23	23	24	25	25	25
D.C.	13	14	15	16	17	17
PUERTO RICO	22	24	24	24	24	24
VIRGIN ISLANDS	8	8*	8*	8*	8*	8*
TOTAL	1,650	1,711	1,801	1,838	1,872	1,933

(For more information, refer to individual state reports.)

PESTICIDES - GENERAL STATEMENT

The entries in this table include State employees only, unless otherwise indicated. County Extension Agents, who in some States engage in pesticide applicator training and certification, are excluded.

FOOTNOTES

[1]
[2]The figures are exclusive of county health departments' employees.
[3]Entries include only employees of the Arkansas State Plant Board.
Entries include personnel of the Department of Food and Agriculture, Agricultural Chemicals and Feed Division, the Pesticide Residue Laboratory, the Pesticides Investigation Laboratory, and the Pesticide Education
[4]Coordinating Unit of the California Extension Service.
Entries include Georgia Department of Agriculture employees and State Extension and Structural Pest Control
[5]Commission personnel. Cooperative Extension Service Field Operations personnel have been excluded.
Entries include Illinois Department of Agriculture employees, State Cooperative Extension personnel, and two
[6]persons with the Department of Public Health.
Data represent employees of the Michigan Department of Agriculture, State Cooperative Extension, Department
[7]of Public Health and the Department of Natural Resources
Entries exclude County Agricultural Inspectors.
[8]Entries include North Carolina Department of Agriculture employees only.
[9]Entires include Oregon Department of Agriculture Plant Division and Laboratory Services employees and
extension personnel involved in coordination of the applicator training program.
[10]Entries include Texas Department of Agriculture, Agricultural and Environmental Sciences Division personnel,
and persons cooperatively involved in pesticide programs representing the Structural Pest Control Board, the
Department of Health Resources, the Water Quality Board, and the Animal Health Commission.

POTABLE WATER - Workforce Projections by State 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	30	32	35	39	43	46
ALASKA	8	16	17	18	18	18
ARIZONA	15	15	15	15	15	15
ARKANSAS	40	40	51	59	61	61
CALIFORNIA	68	68	68	68	68	68
COLORADO	21	23	25	26	26	27
CONNECTICUT	16	16*	16*	16*	16*	16*
DELAWARE	16	19	23	27	31	36
FLORIDA	34	55	55	55	55	55
GEORGIA [1]	34	70	78	85	92	95
HAWAII	38	40	40	40	40	40
IDAHO	20	22	27	32	37	40
ILLINOIS [1,2]	96	96	124	155	155	155
INDIANA [1]	30	43	53	69	71	75
IOWA	10	10	10	10	10	10
KANSAS	19	24	28	31	37	38
KENTUCKY	18	19	26	33	40	43
LOUISIANA	16	16*	16*	16*	16*	16*
MAINE	25	28	28	28	28	28
MARYLAND	14	20	20	22	22	22
MASSACHUSETTS	17	17	17	17	17	17
MICHIGAN [3]	18	29	62	88	113	113
MINNESOTA	10	12	15	18	21	24
MISSISSIPPI	25	31	34	37	38	39
MISSOURI [4]	21	31	46	65	70	70
MONTANA	10	11	11	11	11	11
NEBRASKA	10	11	17	20	24	27
NEVADA	5	6	8	11	12	13
NEW HAMPSHIRE	21	21	21	21	21	21
NEW JERSEY	31	44	46	48	50	53
NEW MEXICO	19	20	22	24	25	26
NEW YORK [1,5]	66	66	66	66	66	141
NORTH CAROLINA [6]	59	131	142	222	260	296
NORTH DAKOTA	7	11	11	11	11	11
OHIO [1]	30	50	55	60	76	86
OKLAHOMA	26	29	35	35	35	35
OREGON [7]	11	11*	11*	11*	11*	11*

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	22	22*	22*	22*	22*	22*
RHODE ISLAND	19	20	23	25	27	28
SOUTH CAROLINA	40	51	60	61	61	61
SOUTH DAKOTA	16	15	18	18	18	18
TENNESSEE	13	25	30	33	37	40
TEXAS [1]	84	94	98	109	122	134
UTAH	10	14	18	20	22	23
VERMONT	18	20	20*	20*	20*	20*
VIRGINIA [8]	38	52	66	81	94	110
WASHINGTON	38	37	36	35	34	33
WEST VIRGINIA	22	30	38	44	47	47
WISCONSIN	20	27	27	27	27	27
WYOMING	9	9	9	9	9	9
D.C.	5	8	8*	8*	8*	8*
PUERTO RICO	7	11	18	18	18	18
VIRGIN ISLANDS	10	10	10	11	12	13
TOTAL	1,325	1,648	1,875	2,150	2,320	2,511

(For more information, refer to individual state reports.)

POTABLE WATER - GENERAL STATEMENT

The substantial increases presented in this table are, for the most part, reflections of anticipation of acceptance of primary enforcement responsibilities for the federal Safe Drinking Water Act (SDWA). It should be borne in mind that the individual state's posture toward acceptance of primacy may have altered subsequent to the development of the table.

The entries in this table include State employees only, unless otherwise indicated.

FOOTNOTES

[1] Increases are due to personnel needs to increase enforcement activities and to SDWA.

[2] Responsibilities for potable water supplies in Illinois are divided between the Illinois Environmental Protection Agency and the Illinois Department of Public Health. The projections assume the state will seek and accept primary enforcement responsibilities for SDWA.

[3] The substantial increases are due to the increased workload anticipated with the acceptance of SDWA.

[4] The increases are due to anticipated acceptance of SDWA. The additional personnel may be federal employees if Missouri does not accept primacy.

[5] The increases in staffing reflect the increase in program activities anticipated once New York assumes primacy for SDWA. The increase is reflected in the last year because program professionals indicate that hiring will be possible only through federal funding and they cannot predict when it will be forthcoming.

[6] These projections, developed by the North Carolina Department of Human Resources, Water Supply Branch, are based on anticipated staffing needs to implement modifications in North Carolina law and to implement SDWA if primacy is accepted.

[7] The Oregon water supply program, as of July 1, 1977, is being administered by U.S. E.P.A. Region X. The future status is uncertain.

[8] The staffing increases are necessary for implementation of SDWA.

RADIATION - Workforce Projections by State 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	9	13	18	18	18	18
ALASKA	1	1	1	1	1	1
ARIZONA	10	10	10	12	14	15
ARKANSAS	35	37	41	44	46	46
CALIFORNIA	65	65	68	70	72	73
COLORADO	38	38	41	42	42	42
CONNECTICUT	8	8	9	10	11	11
DELAWARE	2	2	6	6	7	8
FLORIDA	29	32	38	44	50	55
GEORGIA	39	43	46	48	50	53
HAWAII	2	2	3	3	4	4
IDAHO	4	5	6	7	7	8
ILLINOIS	32	32	35	37	38	40
INDIANA	6	10	10	12	14	14
IOWA	0	0	0	0	0	0
KANSAS	8	8	8	10	10	11
KENTUCKY	23	26	26	26	26	26
LOUISIANA	14	14	18	18	18	18
MAINE	3	3	3	3	3	3
MARYLAND	12	13	14	14	15	15
MASSACHUSETTS	13	13	15	15	15	15
MICHIGAN	12	12	12	12	13	14
MINNESOTA	10	10	10	10	10	12
MISSISSIPPI	10	12	14	16	16	16
MISSOURI	3	5	7	9	11	13
MONTANA	3	3	3	3	4	4
NEBRASKA	5	6	6	7	7	8
NEVADA	2	2	3	3	3	3
NEW HAMPSHIRE	3	3	3	3	3	3
NEW JERSEY	41	45	52	52	52	53
NEW MEXICO	8	8	9	10	11	11
NEW YORK	19	19	19	19	19	19
NORTH CAROLINA	15	21	21	28	28	28
NORTH DAKOTA	4	4	5	5	5	5
OHIO	5	5	6	6	7	7
OKLAHOMA	13	13	13	16	16	16
OREGON	21	21	21	22	22	22

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	24	24	30	30	36	39
RHODE ISLAND	10	10	11	11	12	13
SOUTH CAROLINA	20	23	23	24	25	26
SOUTH DAKOTA	2	2	4	4	5	5
TENNESSEE	11	13	16	20	22	22
TEXAS	33	33	33	38	38	38
UTAH	5	5	6	6	7	7
VERMONT	4	4	4	4	4	4
VIRGINIA	1	1	2	2	3	3
WASHINGTON	8	8	8	8	8	8
WEST VIRGINIA	1	1	1	4	4	4
WISCONSIN	6	6	7	7	11	11
WYOMING	2	2	4	4	4	4
D.C.	5	5	5	5	5	5
PUERTO RICO	10	10	10	10	10	10
VIRGIN ISLANDS	1	1	1	1	1	2
TOTAL	670	712	785	839	883	911

(For more information, refer to individual state reports.)

RADIATION - GENERAL STATEMENT

The entries in this table include State employees only, unless otherwise indicated.

SOLID WASTE - Workforce Projections by State 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	5	5	6	7	8	10
ALASKA	8	11	14	14	16	16
ARIZONA	2	4	7	8	9	9
ARKANSAS	8	11	13	14	14	14
CALIFORNIA[1]	35	70	76	84	91	98
COLORADO	7	7	11	11	12	13
CONNECTICUT	10	10	15	15	15	15
DELAWARE	9	9	13	15	21	21
FLORIDA	25	25*	25*	25*	25*	25*
GEORGIA	36	38	48	56	61	64
HAWAII	2	2	2	3	3	3
IDAHO	9	9	10	12	15	18
ILLINOIS	36	37	38	39	40	41
INDIANA	12	20	30	35	43	50
IOWA	12	13	14	16	17	18
KANSAS	6	6	7	8	9	10
KENTUCKY[2]	33	33	68	83	83	83
LOUISIANA	7	7	12	14	16	16
MAINE	9	9	9	9	9	12
MARYLAND[2]	22	30	36	42	45	48
MASSACHUSETTS	10	10	10	10	10	10
MICHIGAN	11	13	16	19	22	25
MINNESOTA	20	20	20	22	23	24
MISSISSIPPI	8	12	12	12	12	12
MISSOURI	10	12	14	16	18	20
MONTANA	10	10	10	11	11	11
NEBRASKA	7	9	14	16	17	17
NEVADA	11	13	13	14	15	15
NEW HAMPSHIRE	5	5	5	5	5	5
NEW JERSEY[2]	40	56	87	87	87	88
NEW MEXICO	5	5	5	5	8	8
NEW YORK	46	51	51	51	51	51
NORTH CAROLINA[2]	14	22	30	36	38	41
NORTH DAKOTA	3	4	5	8	9	9
OHIO	12	15	24	30	31	31
OKLAHOMA	12	12	16	21	22	22
OREGON	18	25	25	25	25	25

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	72	81	90	99	106	110
RHODE ISLAND	5	6	8	9	9	9
SOUTH CAROLINA	29	33	37	39	39	39
SOUTH DAKOTA	5	6	6	6	7	7
TENNESSEE	20	31	35	35	39	39
TEXAS[3]	66	67	77	120	124	132
UTAH	3	3	4	4*	4*	4*
VERMONT	5	6	7	8	9	10
VIRGINIA	10	10	13	15	18	20
WASHINGTON	25	25	26	28	29	30
WEST VIRGINIA	8	8	8	9	11	11
WISCONSIN[2]	29	44	55	63	69	71
WYOMING	2	2*	2*	2*	2*	2*
D.C.	*	*	*	*	*	*
PUERTO RICO[2]	15	18	29	36	36	36
VIRGIN ISLANDS	*	*	*	*	*	*
TOTAL	829	990	1,208	1,376	1,458	1,518

(For more information, refer to individual state reports.)

SOLID WASTE - GENERAL STATEMENT

The substantial increases presented in this table reflect the anticipated staffing needs to implement the federal Resource Conservation and Recovery Act (RCRA) and the Toxic Substances Control Act.

The entries in this table include State employees only, unless otherwise indicated.

FOOTNOTES

[1]The projections are those of the California Solid Waste Management Board. They reflect needs for RCRA and local solid waste enforcement agency programs.

[2]The substantial increases are due to anticipated implementation of RCRA.

[3]Increases reflect implementation of new state laws and increased enforcement activities. The Texas Bureau of Environmental Health, Division of Solid Waste Management, and the Texas Water Quality Board, Solid Waste Management personnel, are included.

WASTEWATER - Workforce Projections by State 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	63	70	76	81	86	90
ALASKA	18	20	21	23	24	24
ARIZONA	17	17	17	17	17	17
ARKANSAS	36	38	40	42	44	46
CALIFORNIA	496	501	508	515	523	531
COLORADO	41	41	43	45	45	45
CONNECTICUT	76	76*	76*	76*	76*	76*
DELAWARE	36	36	39	39	45	45
FLORIDA[1,2]	224	246	271	298	328	361
GEORGIA[1,3]	107	111	122	133	145	152
HAWAII	34	34	30	30	30	30
IDAHO	35	35	35	44	47	50
ILLINOIS	196	196	196	196	196	196
INDIANA[1]	113	120	142	145	153	158
IOWA[1]	58	62	67	72	78	85
KANSAS[1]	50	62	73	77	80	83
KENTUCKY	100	115	123	132	140	147
LOUISIANA	78	78*	78*	78*	78*	78*
MAINE	62	62*	62*	62*	62*	62*
MARYLAND[4]	182	219	226	238	244	251
MASSACHUSETTS	111	111	111	111	111	111
MICHIGAN	79	89	90	91	92	94
MINNESOTA	102	102	102	102	102	102
MISSISSIPPI	68	68	69	69	70	70
MISSOURI	66	76	82	82	82	85
MONTANA	7	8	8	8	8	8
NEBRASKA	39	43	51	53	54	54
NEVADA	10	11	12	13	13	13
NEW HAMPSHIRE	107	110	110	110	110	110
NEW JERSEY[1]	273	410	446	474	494	505
NEW MEXICO	21	22	25	28	30	32
NEW YORK[1]	414	429	448	465	485	505
NORTH CAROLINA[1]	112	127	130	136	143	147
NORTH DAKOTA	23	26	27	29	31	33
OHIO	55	63	72	82	84	96
OKLAHOMA	46	48	52	54	56	56
OREGON	35	35	35	35	35	35

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	175	175	175	175	175	175
RHODE ISLAND	20	20	21	23	24	24
SOUTH CAROLINA	145	143	144	144	144	144
SOUTH DAKOTA	21	23	27	29	33	33
TENNESSEE	159	159	167	167	167	167
TEXAS	298	298	304	315	326	329
UTAH	19	24	27	28	30	30
VERMONT	92	92*	92*	92*	92*	92*
VIRGINIA[1]	345	350	361	372	383	393
WASHINGTON	53	53	53	53	53	53
WEST VIRGINIA[1,5]	107	116	125	138	151	165
WISCONSIN	148	158	158	158	158	158
WYOMING	24	24*	24*	24*	24*	24*
D.C.	*	*	*	*	*	*
PUERTO RICO[1]	71	74	78	82	86	91
VIRGIN ISLANDS	*	*	*	*	*	*
TOTAL	5,267	5,626	5,871	6,085	6,287	6,461

(For more information, refer to individual state reports.)

WASTEWATER - GENERAL STATEMENT

The entries in this table include State employees only, unless otherwise indicated.

FOOTNOTES

[1]The substantial increases are due to increased demand for services and enforcement activities.
[2]The increases are dependent upon funding from the state legislature, and may not be actualized.
[3]The projections reflect perceived need, but are dependent upon federal and state appropriations.
[4]The increases are partially due to implementation of state legislation.
[5]The increases are based on the assumption by the state of construction grants review and National Pollution Discharge Elimination System (NPDES) delegation. Thus, the bulk of the growth may occur in a single year rather than as indicated.

ENERGY - Workforce Projections by State 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	5	7	9	10	11	12
ALASKA	5	5	8	9	11	11
ARIZONA	9	9	6	6	6	7
ARKANSAS	10	11	15	19	22	24
CALIFORNIA	573	573	573	573	573	573
COLORADO	N/A	N/A	N/A	N/A	N/A	N/A
CONNECTICUT	43	37	37	37	37	37
DELAWARE	3	7	7	7	7	7
FLORIDA	18	22	30	32	35	40
GEORGIA	N/A	N/A	N/A	N/A	N/A	N/A
HAWAII	4	4	4	4	4	12
IDAHO	9	10	11	12	13	14
ILLINOIS	N/A	N/A	N/A	N/A	N/A	N/A
INDIANA	7	7	7	9	10	10
IOWA	7	7	7	7	7	7
KANSAS	11	11	11	12	12	13
KENTUCKY	20	22	24	26	28	28
LOUISIANA	N/A	N/A	N/A	N/A	N/A	N/A
MAINE	8	8	8	8	8	8
MARYLAND	10	20	20	20	20	20
MASSACHUSETTS	N/A	N/A	N/A	N/A	N/A	N/A
MICHIGAN	15	15	17	20	23	25
MINNESOTA	43	43	45	47	49	51
MISSISSIPPI	2	2	2	2	2	2
MISSOURI	6	9	11	13	15	17
MONTANA	N/A	N/A	N/A	N/A	N/A	N/A
NEBRASKA	7	7	7	7	7	7
NEVADA	0	0	0	0	0	0
NEW HAMPSHIRE	N/A	N/A	N/A	N/A	N/A	N/A
NEW JERSEY	N/A	N/A	N/A	N/A	N/A	N/A
NEW MEXICO	37	38	39	40	41	42
NEW YORK	N/A	N/A	N/A	N/A	N/A	N/A
NORTH CAROLINA	11	19	20	21	22	23
NORTH DAKOTA	N/A	N/A	N/A	N/A	N/A	N/A
OHIO	93	107	112	114	116	118
OKLAHOMA	N/A	N/A	N/A	N/A	N/A	N/A
OREGON	30	43	43	43	43	43

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	27	38	50	50	50	50
RHODE ISLAND	6	6	6	6	6	6
SOUTH CAROLINA	10	13	14	14	14	14
SOUTH DAKOTA	7	9	16	18	23	25
TENNESSEE	16	16	16	16	16	16
TEXAS	N/A	N/A	N/A	N/A	N/A	N/A
UTAH	64	67	70	74	78	82
VERMONT	6	6	6	6	6	6
VIRGINIA	11	15	20	20	20	20
WASHINGTON	10	20	25	30	35	40
WEST VIRGINIA	N/A	N/A	N/A	N/A	N/A	N/A
WISCONSIN	6	7	7	7	7	7
WYOMING	30	38	40	42	42	42
D.C.	N/A	N/A	N/A	N/A	N/A	N/A
PUERTO RICO	N/A	N/A	N/A	N/A	N/A	N/A
VIRGIN ISLANDS	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL	1,179	1,278	1,343	1,381	1,419	1,459

(For more information, refer to individual state reports.)

ENERGY - GENERAL STATEMENT

N/A = "Not Applicable": Because of the pervasive nature of energy-related activities, many states have persons dealing with energy matters scattered throughout the state governmental structure. In order to achieve some degree of consistency, only employees of state energy offices, agencies, commissions, or divisions are included in the table.

* Total Public Sector Workforce Projections by State 1976-1982(est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	236	257	294	313	329	346
ALASKA	58	72	84	89	95	95
ARIZONA	187	198	201	207	213	220
ARKANSAS	219	227	250	272	282	286
CALIFORNIA	2,684	2,826	2,903	2,975	3,048	3,125
COLORADO	182	185	204	216	222	228
CONNECTICUT	275	269	275	276	277	278
DELAWARE	98	110	130	137	158	165
FLORIDA	638	707	783	841	905	974
GEORGIA	376	418	453	482	509	536
HAWAII	122	124	121	122	123	133
IDAHO	103	115	127	148	163	176
ILLINOIS	559	562	598	635	640	645
INDIANA	330	404	446	476	503	521
IOWA	147	152	158	167	174	184
KANSAS	170	187	203	215	227	237
KENTUCKY	394	419	492	540	563	575
LOUISIANA	175	180	191	194	196	196
MAINE	136	139	139	139	139	142
MARYLAND	458	521	536	557	568	578
MASSACHUSETTS	272	272	274	274	274	286
MICHIGAN	387	410	449	482	515	528
MINNESOTA	260	264	275	284	292	302
MISSISSIPPI	225	239	246	257	260	275
MISSOURI	254	284	311	336	347	362
MONTANA	83	84	85	87	90	91
NEBRASKA	102	111	131	139	145	149
NEVADA	70	76	82	89	93	94
NEW HAMPSHIRE	163	166	166	166	166	171
NEW JERSEY	575	758	851	895	931	962
NEW MEXICO	152	156	164	172	181	186
NEW YORK	809	891	935	968	1,004	1,112
NORTH CAROLINA	423	531	555	657	706	755
NORTH DAKOTA	74	88	91	98	102	104
OHIO	538	594	656	684	719	752
OKLAHOMA	185	191	208	221	226	227
OREGON	270	298	301	310	315	321

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	558	586	659	688	737	763
RHODE ISLAND	86	95	104	112	118	123
SOUTH CAROLINA	351	371	391	396	402	405
SOUTH DAKOTA	68	70	86	90	101	103
TENNESSEE	403	430	452	461	472	476
TEXAS	1,101	1,134	1,185	1,271	1,315	1,352
UTAH	159	172	188	198	209	215
VERMONT	151	154	155	156	157	158
VIRGINIA	530	559	599	634	668	701
WASHINGTON	239	251	256	262	267	272
WEST VIRGINIA	200	224	252	283	310	333
WISCONSIN	319	360	372	385	390	392
WYOMING	104	112	117	120	120	120
D.C.	46	54	59	60	61	61
PUERTO RICO	156	177	201	216	222	229
VIRGIN ISLANDS	30	30	30	31	32	34
TOTAL	16,890	18,264	19,474	20,483	21,281	22,054

(For more information, refer to individual state reports.)

*Includes totals taken from tables on pages 30 through 45.

(Private) Wastewater-Certified Operators by State 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	654	671	688	705	731	736
ALASKA	46	46*	46*	46*	46*	46*
ARIZONA	530	744	958	1,172	1,386	1,600
ARKANSAS	1,325	1,375	1,426	1,486	1,541	1,599
CALIFORNIA	7,655	8,044	8,435	8,824	9,215	9,065
COLORADO	978	1,104	1,230	1,335	1,450	1,576
CONNECTICUT	615	695	785	887	1,002	1,132
DELAWARE	250	262	275	287	300	312
FLORIDA	2,706	2,661	2,874	3,105	3,355	3,626
GEORGIA	1,247	1,448	1,647	1,847	2,046	2,247
HAWAII	56	56*	56*	56*	56*	56*
IDAHO	326	385	447	514	579	646
ILLINOIS	2,201	2,395	2,610	2,845	3,102	3,385
INDIANA	*	*	*	*	*	*
IOWA	4,361	4,361*	4,361*	4,361*	4,361*	4,361*
KANSAS	400	400*	400*	400*	400*	400*
KENTUCKY	1,400	1,800	2,200	2,600	3,000	3,400
LOUISIANA	585	585*	585*	585*	585*	585*
MAINE	275	310	345	380	415	450
MARYLAND	800	800*	800*	800*	800*	800*
MASSACHUSETTS	*	*	*	*	*	*
MICHIGAN	1,619	1,659	1,700	1,743	1,787	1,832
MINNESOTA	728	728*	728*	728*	728*	728*
MISSISSIPPI	244	300	356	413	469	525
MISSOURI	2,000	2,567	2,715	2,871	3,037	3,212
MONTANA	623	685	752	827	911	1,004
NEBRASKA	344	344*	344*	344*	344*	344*
NEVADA	66	76	87	101	115	125
NEW HAMPSHIRE	*	*	*	*	*	*
NEW JERSEY	*	*	*	*	*	*
NEW MEXICO	435	446	457	469	481	493
NEW YORK	*	*	*	*	*	*
NORTH CAROLINA	1,778	2,373	3,967	3,731	4,480	5,074
NORTH DAKOTA	134	143	153	163	171	178
OHIO	1,640	1,640*	1,640*	1,640*	1,640*	1,640*
OKLAHOMA	1,241	1,297	1,355	1,415	1,458	1,472
OREGON	*	*	*	*	*	*

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	*	*	*	*	*	*
RHODE ISLAND	*	*	*	*	*	*
SOUTH CAROLINA	2,419	2,845	3,297	3,598	3,799	3,999
SOUTH DAKOTA	203	212	222	232	241	251
TENNESSEE	1,400	1,535	1,671	1,806	1,942	2,077
TEXAS	14,099	14,099	14,826	15,566	16,508	16,508
UTAH	*	*	*	*	*	*
VERMONT	240	240*	240*	240*	240*	240*
VIRGINIA	1,283	1,496	1,709	1,922	2,135	2,348
WASHINGTON	1,206	1,433	1,597	1,711	1,873	2,081
WEST VIRGINIA	*	*	*	*	*	*
WISCONSIN	1,849	2,034	2,219	2,404	2,589	2,774
WYOMING	*	*	*	*	*	*
D.C.	*	*	*	*	*	*
PUERTO RICO	*	*	*	*	*	*
VIRGIN ISLANDS	*	*	*	*	*	*
TOTAL	59,711	64,033	69,862	73,872	79,018	82,615

(For more information, refer to individual reports.)

(Private) Potable Water-Certified Operators 1976-1982 (est.)

STATES	1976	1977	1978	1979	1980	1981
ALABAMA	1,098*	1,098*	1,098*	1,098*	1,098*	1,098*
ALASKA	8	16	17	18	18	18
ARIZONA	745	894	1,043	1,192	1,341	1,490
ARKANSAS	750	787	826	867	910	912
CALIFORNIA	5,279	5,279	5,279	5,279	5,279	5,279
COLORADO	1,461	1,639	1,816	1,993	2,129	2,266
CONNECTICUT	30	30	30	40	50	60
DELAWARE	*	*	*	*	*	*
FLORIDA	1,934	2,091	2,262	2,446	2,647	2,865
GEORGIA	1,247	1,447	1,647	1,847	2,047	2,247
HAWAII	*	*	*	*	*	*
IDAHO	101	190	288	400	488	556
ILLINOIS	2,505	2,630	2,762	2,901	3,046	3,198
INDIANA	1,744	1,794	1,844	1,894	1,944	1,994
IOWA	*	*	*	*	*	*
KANSAS	*	300	700	1,100	1,500	1,900
KENTUCKY	717	980	1,239	1,481	1,752	2,024
LOUISIANA	910	956	1,004	1,054	1,107	1,162
MAINE	306	306*	306*	306*	306*	306*
MARYLAND	700	776	889	984	1,077	1,171
MASSACHUSETTS	*	*	*	*	*	*
MICHIGAN	298	324	353	384	419	456
MINNESOTA	1,495	1,645	1,795	1,945	2,095	2,245
MISSISSIPPI	153	223	292	366	436	500
MISSOURI	552	552*	552*	552*	552*	552*
MONTANA	623	685	752	827	911	1,004
NEBRASKA	250*	250*	250*	250*	250*	250*
NEVADA	100	100*	100*	100*	100*	100*
NEW HAMPSHIRE	760	760*	760*	760*	760*	760*
NEW JERSEY	*	*	*	*	*	*
NEW MEXICO	431	443	455	469	483	497
NEW YORK	*	*	*	*	*	*
NORTH CAROLINA	1,734	1,926	2,117	2,309	2,500	2,692
NORTH DAKOTA	228	243	260	277	297	318
OHIO	2,500	2,500*	2,500*	2,500*	2,500*	2,500*
OKLAHOMA	1,709	1,789	1,855	1,933	2,013	2,098
OREGON	*	*	*	*	*	*

STATES	1976	1977	1978	1979	1980	1981
PENNSYLVANIA	*	*	*	*	*	*
RHODE ISLAND	*	*	*	*	*	*
SOUTH CAROLINA	1,185	1,252	1,323	1,393	1,463	1,533
SOUTH DAKOTA	263	275	289	303	318	333
TENNESSEE	1,143	1,752	1,904	2,056	2,208	2,360
TEXAS	7,320	7,569	7,946	8,342	8,754	9,185
UTAH	500	500	550	600	900	900
VERMONT	450	450*	450*	450*	450*	575
VIRGINIA	1,500	1,500*	1,500*	1,500*	1,500*	2,500
WASHINGTON	1,250	1,319	1,384	1,463	1,506	1,550
WEST VIRGINIA	*	*	*	*	*	*
WISCONSIN	1,445	1,584	1,723	1,863	2,003	2,143
WYOMING	159	182	210	241	276	316
D.C.	*	*	*	*	*	*
PUERTO RICO	*	*	*	*	*	*
VIRGIN ISLANDS	*	*	*	*	*	*
TOTAL	42,273	45,108	48,249	51,460	53,515	57,861

(For more information, refer to individual state reports.)

FOOTNOTES

[1] Due to the recent implementation of mandatory certification requirements in Kansas, the figures represent the best available estimation of the total to be certified and the rate of certification.

[2] The 2,500 certified operators noted for 1981 is the estimate of needed certified operators by that date. There is no available schedule for rate of increase.

Total Public Sector Workforce Projections by Environmental Category 1976-1982 (est.)

CATEGORY	1976	1977	1978	1979	1980	1981
AIR	5,831	6,157	6,408	6,613	6,829	7,026
NOISE	139	142	183	201	213	235
PESTICIDES	1,650	1,711	1,801	1,838	1,872	1,933
POTABLE WATER	1,325	1,648	1,875	2,150	2,320	2,511
RADIATION	670	712	785	839	883	911
SOLID WASTE	829	990	1,208	1,376	1,458	1,518
WASTEWATER	5,267	5,626	5,871	6,035	6,287	6,461
ENERGY	1,179	1,278	1,343	1,381	1,419	1,459
TOTAL	16,890	18,264	19,474	20,483	21,281	22,054

* Includes Totals taken from Tables on pages 30 through 45.

(For more information, refer to individual state reports.)

WORKFORCE PROJECTIONS BY REGION

AIR—Workforce Projections By Region 1976-1982 (est.)

REGIONS	1976	1977	1978	1979	1980	1981	%/annum growth (average)
I	30	36	39	45	52	59	15%
II	60	63	67	71	75	78	5%
III	77	83	97	114	123	130	11%
IV	61	63	66	66	66	66	1%
V	69	90	104	108	114	118	12%
VI	56	56	59	63	65	68	4%
VII	34	40	41	47	51	56	10%
VIII	49	49	82	90	99	99	17%
IX	81	89	99	99	99	99	4%
X	38	38	38	38	38	38	0%
TOTAL	555	607	692	741	782	811	8%

[For more information, refer to individual regional reports.]

NOISE—Workforce Projections By Region 1976-1982 (est.)

REGIONS	1976	1977	1978	1979	1980	1981	%/annum growth (average)
I	2	2	3	3	4	4	N/A
II	3	4	5	5	5	5	N/A
III	1	2	4	5	5	5	N/A
IV	2	3	4	4	4	4	N/A
V	1	2	2	3	3	4	N/A
VI	1	1	2	2	3	3	N/A
VII	1	1	2	3	3	3	N/A
VIII	3	3	4	5	6	7	N/A
IX	1	1	1	2	2	2	N/A
X	2	2	2	2	2	2	N/A
TOTAL	17	21	29	34	37	39	18%

[For more information, refer to individual regional reports.]

PESTICIDES—Workforce Projections By Regions 1976-1982 (est.)

REGIONS	1976	1977	1978	1979	1980	1981	%/annum growth (average)
I	10	10	1:	12	13	13	5%
II	31	34	37	41	45	50	10%
III	16	18	20	22	24	26	10%
IV	34	36	41	44	47	50	8%
V	22	23	24	25	27	29	6%
VI	19	19	22	23	23	23	4%
VII	17	18	19	20	21	21	4%
VIII	17	17	17	17	17	17	0%
IX	27	28	35	35	35	35	6%
X	6	7	8	9	9	9	9%
TOTAL	199	210	234	248	261	273	7%

[For more information, refer to individual regional reports.]

POTABLE WATER—Workforce Projections By Regions 1976-1982 (est.)

REGIONS	1976	1977	1978	1979	1980	1981	%/annum growth (average)
I	13	14	14	15	15	16	4%
II	8	9	10	11	12	13	10%
III	13	21	30	30	30	30	21%
IV	16	22	27	33	37	40	21%
V	13	17	18	19	20	21	11%
VI*	--	--	--	--	--	--	--
VII	8	10	15	17	20	20	21%
VIII*	--	--	--	--	--	--	--
IX	11	13	15	15	15	15	7%
X	7	8	8	9	9	9	5%
TOTAL	89	114	137	149	158	164	13%

*These figures are included in the wastewater table for the respective Regions.

[For more information, refer to individual regional reports.]

RADIATION—Workforce Projection By Regions 1976-1982 (est.)

REGIONS	1976	1977	1978	1979	1980	1981	%/annum growth (average)
I	2	2	2	2	2	2	0%
II	3	4	5	5	6	6	10%
III	1	1	4	4	5	5	N/A
IV	3	4	6	7	8	8	N/A
V	2	3	3	3	3	3	N/A
VI	1	1	4	5	6	7	N/A
VII	3	3	3	4	4	4	N/A
VIII	1	2	3	4	5	6	N/A
IX	1	2	2	2	2	2	N/A
X	2	2	2	2	2	2	0%
TOTAL	19	24	34	38	43	45	19%

[For more information, refer to individual regional reports.]

SOLID WASTE—Workforce Projections By Regions 1976-1982 (est.)

REGIONS	1976	1977	1978	1979	1980	1981	%/annum growth (average)
I	4	6	9	11	12	12	27%
II	4	5	17	17	20	20	57%
III	4	7	10	15	15	15	34%
IV	5	16	26	30	30	30	60%
V	5	6	23	35	39	47	77%
VI	2	3	4	6	6	6	27%
VII	4	15	32	32	32	32	78%
VIII	3	3	5	6	7	7	20%
IX	6	6	8	11	12	12	10%
X	3	4	6	6	7	7	20%
TOTAL	40	71	140	169	180	188	41%

[For more information, refer to individual regional reports.]

WASTEWATER—Workforce Projections By Regions 1976-1982 (est.)

REGIONS	1976	1977	1978	1979	1980	1981	%/annum growth (average)
I	78	81	91	94	94	94	4%
II	279	293	307	322	338	355	5%
III	268	295	325	358	394	433	10%
IV	186	204	217	229	236	243	6%
V	202	237	277	324	379	443	17%
VI*	107	113	119	125	132	139	5%
VII	71	113	134	145	156	164	20%
VIII*	91	96	99	103	107	112	4%
IX	147	142	152	152	152	152	1%
X	47	47	48	48	49	49	1%
TOTAL	1,476	1,621	1,769	1,900	2,037	2,184	8%

*Regional potable water personnel are included in these figures.
[For more information, refer to individual regional reports.]

ENERGY—Workforce Projections By Regions 1976-1982 (est.)

REGIONS	1976*	1977*	1978*	1979*	1980*	1981*	%/annum growth (average)
I	--	--	--	--	--	--	--
II	--	--	--	--	--	--	--
III	--	--	--	--	--	--	--
IV	--	--	--	--	--	--	--
V	--	--	--	--	--	--	--
VI	0	0	3	3	3	3	N/A
VII	--	--	--	--	--	--	--
VIII	20	20	21	21	22	22	2%
IX	--	--	--	--	--	--	--
X	--	--	--	--	--	--	--
TOTAL	20	20	24	24	25	25	5%

*Included in this table are only energy personnel employed by the Environmental Protection Agency. [For more information, refer to individual regional reports.]

Total Workforce Projections by Region 1976-1982 (est.)

REGIONS	1976	1977	1978	1979	1980	1981	%/annum growth (average)
I	139	151	169	182	192	200	8%
II	388	412	448	472	501	527	6%
III	380	427	490	548	596	644	11%
IV	307	348	387	413	428	441	8%
V	314	378	451	517	585	665	16%
VI	186	193	213	227	238	249	6%
VII	138	200	246	268	287	300	18%
VIII	184	190	231	246	263	270	8%
IX	274	281	312	316	317	317	3%
X	105	108	112	114	116	116	2%
TOTAL	2,415	2,638	3,059	3,303	3,523	3,729	9%

[These figures do not represent the total numbers of personnel in the regional EPA offices, but the numbers working specifically in the eight fields covered by this study. For more information, refer to individual regional reports.]

Total Regional Workforce Projections by Environmental Category 1976-1982 (est.)

CATEGORY	1976	1977	1978	1979	1980	1981	%/annum growth (average)
AIR	555	607	692	741	782	811	8%
NOISE	17	21	29	34	37	39	18%
PESTICIDES	199	210	234	248	261	273	7%
POTABLE WATER*	89	114	137	149	158	164	13%
RADIATION	19	24	34	38	43	45	19%
SOLID WASTE	40	71	140	169	180	188	41%
WASTEWATER*	1,476	1,621	1,769	1,900	2,037	2,184	8%
ENERGY	20	20	24	24	25	25	5%
TOTAL	2,415	2,688	3,059	3,303	3,523	3,729	9%

*For Regions VI and VIII potable water personnel are included in the wastewater category.

[For more information, refer to individual regional reports.]